

09/941,166

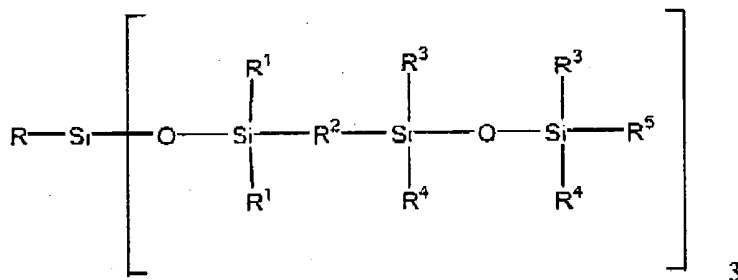
- 2 -

Amendments to the Claims

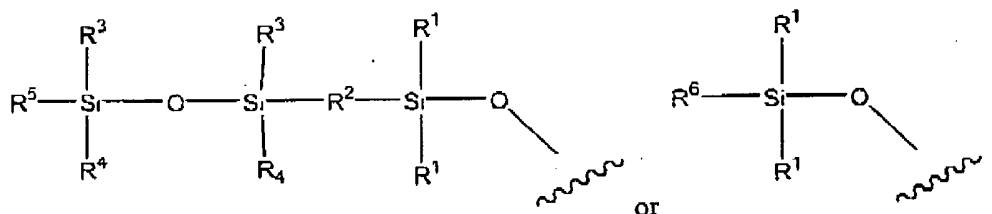
Please amend Claims 4, 9, 23, 26, 31 and 45. The Claim Listing below will replace all prior versions of the claims in the application.

Claim Listing

1. (Cancelled)
2. (Previously Presented) A compound represented by the following structural formula:



wherein R is represented by a structural formula selected from:



wherein:

each group  $\text{R}^1$ , each group  $\text{R}^3$  and each group  $\text{R}^4$  is independently a substituted or unsubstituted  $\text{C}_{1-12}$  alkyl,  $\text{C}_{1-12}$  cycloalkyl, aryl substituted  $\text{C}_{1-12}$  alkyl or aryl group;

each group  $\text{R}^2$  is independently a substituted or unsubstituted  $\text{C}_{1-12}$  alkylene,  $\text{C}_{1-12}$  cycloalkylene,  $\text{C}_{1-12}$  arylalkylene, or arylene group,  $-\text{Y}_1-[\text{O}-\text{Y}_1]_p-$ ,  $-\text{Y}_1-\text{Si}(\text{R}^2)_2-\text{Y}_1-$ ,  $-\text{Y}_1-\text{Si}(\text{R}^2)_2-\text{Y}_1-\text{O}-\text{Y}_1-\text{Si}(\text{R}^2)_2-\text{Y}_1-$ , or  $-\text{Y}_1-\text{Si}(\text{R}^2)_2-\text{Y}_1-\text{Si}(\text{R}^2)_2-\text{Y}_1-$ ;

09/941,166

- 3 -

each group  $R^5$  is independently, an epoxide substituted aliphatic group having 2-10 carbon atoms; and

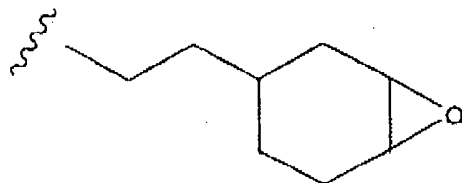
each group  $R^6$  is independently hydrogen, an alkenyl, a substituted or unsubstituted  $C_{1-12}$  alkyl,  $C_{1-12}$  cycloalkyl, aryl substituted  $C_{1-12}$ -alkyl or aryl or  $R^2-(O-Y_1)_m-$ ,  $(R^2)_3Si-(O-Si(R^2)_2)_q-Y_1-$  or  $(R^2)_3Si-(O-Si(R^2)_2)_q-O-$ ;

each  $R^2$  is independently a substituted or unsubstituted  $C_{1-12}$  alkyl group,  $C_{1-12}$  cycloalkylalkyl group, aryl substituted  $C_{1-12}$  alkyl group or aryl group;

each  $Y_1$  is independently a  $C_{1-12}$  alkylene group;

$p$  is an integer from 1 to 5;  $m$  is an integer from 1 to 10; and  $q$  is an integer from 0 to 4.

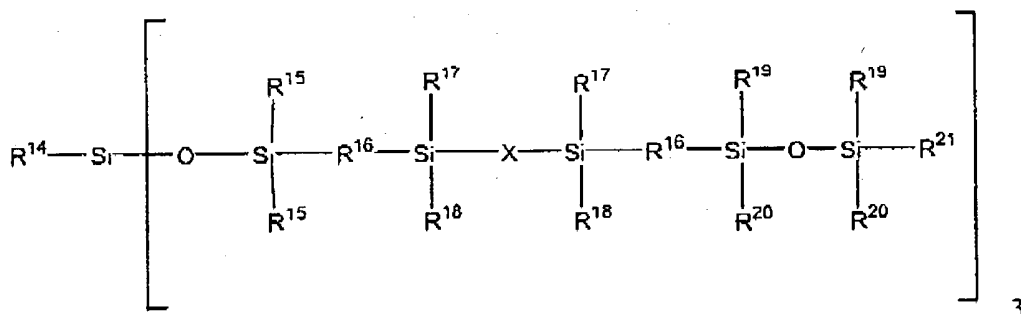
3. (Original) The compound of Claim 2 wherein each group  $R^2$  is independently, a substituted or unsubstituted  $C_{1-12}$  alkylene,  $C_{1-12}$  cycloalkylene,  $C_{1-12}$  substituted arylalkylene, or arylene group; and each  $R^6$  is independently a substituted or unsubstituted  $C_{1-12}$  alkylsilane,  $C_{1-12}$  cycloalkylsilane,  $C_{1-12}$  alkoxysilane, aryl substituted  $C_{1-12}$  alkylsilane, a hydrogen, a vinyl, a substituted or unsubstituted  $C_{1-12}$  alkyl,  $C_{1-12}$  dialkylether,  $(C_{1-12}$  cycloalkyl) $C_{1-12}$  alkylether,  $C_{1-12}$  cycloalkyl, aryl substituted  $C_{1-12}$  alkyl or aryl group.
4. (Currently amended) The compound of Claim 3 wherein ~~at least one  $R^5$  comprises the~~ epoxide in  $R^5$  is a cycloalkene oxide.
5. (Original) The compound of Claim 3 wherein each  $R^5$  is represented by the following structural formula:



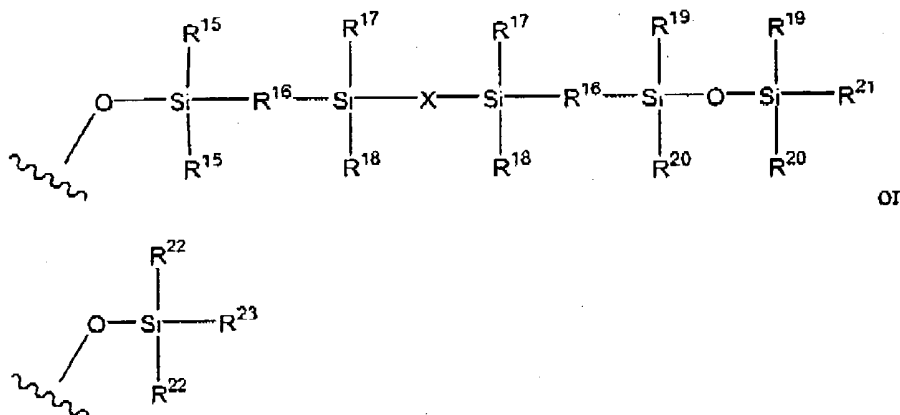
09/941,166

- 4 -

6. (Original) The compound of Claim 3 wherein  $R^1$  is a methyl group; each group  $R^2$  is an ethylene, hexylene, or octylene group; each group  $R^3$  is a methyl group; each group  $R^4$  is a methyl group; each group  $R^5$  is a 2-(3,4-epoxycyclohexyl) ethyl grouping, and each group  $R^6$  is a hydrogen or ethenyl.
7. (Previously Presented) A compound represented by the following structural formula:



wherein  $R^{14}$  is represented by a structural formula selected from:



each group  $R^{15}$ , each group  $R^{17}$ , each group  $R^{18}$ , each group  $R^{19}$ , each group  $R^{20}$  and each group  $R^{22}$  is independently a substituted or unsubstituted  $C_{1-12}$  alkyl,  $C_{1-12}$  cycloalkyl, aryl substituted  $C_{1-12}$  alkyl or aryl group;

09/941,166

- 5 -

each group  $R^{16}$  is independently a substituted or unsubstituted  $C_{1-12}$  alkylene,  $C_{1-12}$  cycloalkylene,  $C_{1-12}$  arylalkylene, or arylene group,  $-Y_1-[O-Y_1]_p-$ ,  $-Y_1-Si(R^2)_2-Y_1-$ ,  $-Y_1-Si(R^2)_2-Y_1-O-Y_1-Si(R^2)_2-Y_1-$ , or  $-Y_1-Si(R^2)_2-Y_1-Si(R^2)_2-Y_1-$ ;

each  $R^{21}$  is independently an epoxide substituted aliphatic group having 2-10 carbon atoms;

$R^{23}$  is independently hydrogen, an alkenyl, a substituted or unsubstituted  $C_{1-12}$  alkyl,  $C_{1-12}$  cycloalkyl, aryl substituted  $C_{1-12}$ -alkyl or aryl or  $R^2-(O-Y_1)_m-$ ,  $(R^2)_3Si-(O-Si(R^2)_2)_q-Y_1-$  or  $(R^2)_3Si-(O-Si(R^2)_2)_q-O-$ ;

each group X is independently oxygen or  $R^{16}$ ;

each  $R^2$  is independently a substituted or unsubstituted  $C_{1-12}$  alkyl group,  $C_{1-12}$  cycloalkylalkyl group, aryl substituted  $C_{1-12}$  alkyl group or aryl group;

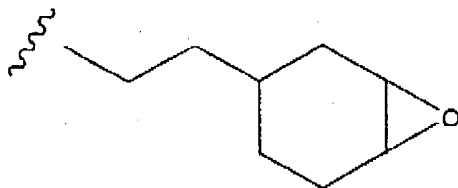
each  $Y_1$  is independently a  $C_{1-12}$  alkylene group;

p is an integer from 1 to 5; m is an integer from 1 to 10; and q is an integer from 0 to 4.

8. (Original) The compound of Claim 7 wherein each group  $R^{16}$  is independently a substituted or unsubstituted  $C_{1-12}$  alkylene,  $C_{1-12}$  cycloalkylene, aryl substituted  $C_{1-12}$  alkylene or arylene group;  $R^{23}$  is, independently, a hydrogen, a monovalent substituted or unsubstituted  $C_{1-12}$  alkyl,  $C_{1-12}$  dialkylether (alkyl-O-alkylene-),  $C_{1-12}$  cycloalkyl  $C_{1-12}$  alkylether,  $C_{1-12}$  cycloalkyl, aryl substituted  $C_{1-12}$  alkyl or aryl group; and X is oxygen.
9. (Currently Amended) The compound of Claim 8 wherein ~~at least one  $R^{21}$  comprises the~~ epoxide in  $R^{21}$  is a cycloalkene oxide.
10. (Original) The compound of Claim 9 wherein each is  $R^{21}$  represented by the following structural formula:

09/941,166

- 6 -



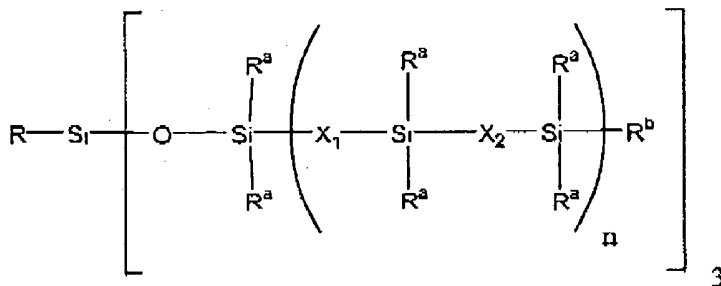
11. (Original) The compound of Claim 10 wherein: each group R<sup>15</sup>, R<sup>17</sup>, R<sup>18</sup>, R<sup>19</sup>, R<sup>20</sup> and R<sup>22</sup> is a methyl group; each group R<sup>16</sup> is an ethylene, hexylene, or octylene group; and R<sup>23</sup> is a hydrogen, hexyl, or alkylether.

12-22. (Cancelled)

23. (Currently Amended) A holographic recording medium comprising:

- at least one polyfunctional epoxide monomer;
- a binder which is capable of supporting cationic polymerization;
- an acid generator capable of producing an acid upon exposure to actinic radiation; and, optionally,
- a sensitizer,

wherein the polyfunctional epoxide monomer is by the following structural formula:



wherein:

X<sub>1</sub> and X<sub>2</sub> are independently each an inert linking group oxygen or a substituted or unsubstituted C<sub>1-12</sub> alkylene, C<sub>1-12</sub> cycloalkylene, C<sub>1-12</sub> arylalkylene, or arylene

09/941,166

- 7 -

group,  $-Y_1-[O-Y_1]_p-$ ,  $-Y_1-Si(R^2)_2-Y_1-$ ,  $-Y_1-Si(R^2)_2-Y_1-O-Y_1-Si(R^2)_2-Y_1-$ , or  $-Y_1-Si(R^2)_2-Y_1-Si(R^2)_2-Y_1-$ ;

each  $R^2$  is independently a substituted or unsubstituted C<sub>1-12</sub> alkyl group, C<sub>1-12</sub> cycloalkylalkyl group, aryl substituted C<sub>1-12</sub> alkyl group or aryl group;

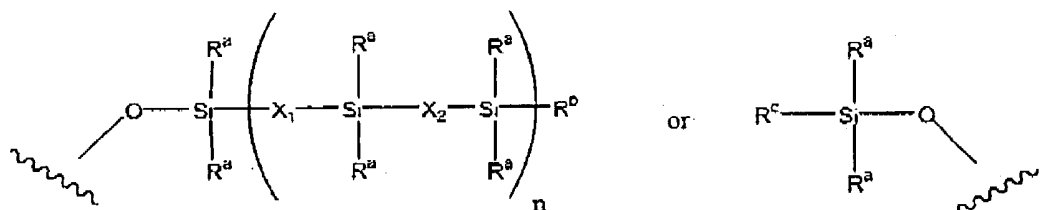
each  $Y_1$  is independently a C<sub>1-12</sub> alkylene group;

$p$  is an integer from 1 to 5;

each  $R^3$  is independently a substituted or unsubstituted aliphatic group or a substituted or unsubstituted aryl group;

$n$  is 1, 2, 3 or 4;

$R$  is a substituted or unsubstituted aliphatic group, a substituted or unsubstituted aryl group or is represented by a structural formula selected from:



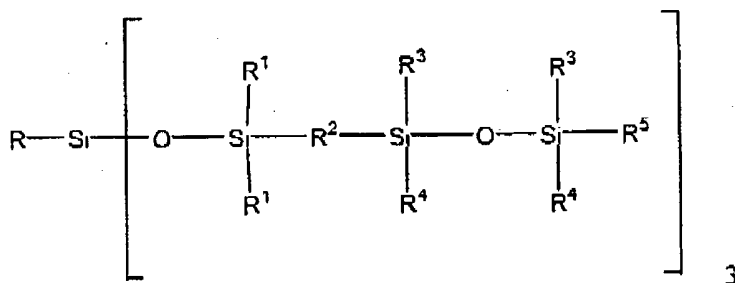
each  $R^b$  is independently an epoxide substituted aliphatic group; and

$R^c$  is H, an unsubstituted aliphatic group, a substituted aliphatic group, an unsubstituted aryl group, a substituted aryl group, a substituted siloxane group, an unsubstituted siloxane group, a substituted polysiloxane group or an unsubstituted polysiloxane group.

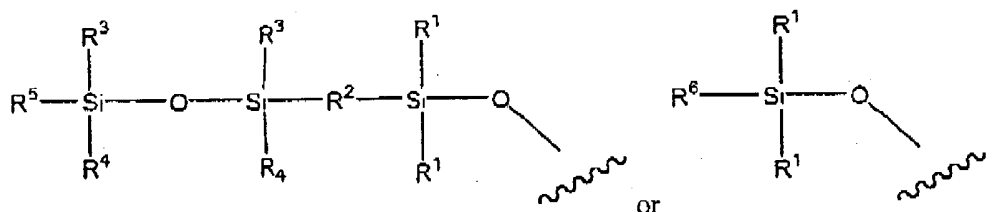
24. (Original) The holographic recording medium of Claim 23 wherein the polyfunctional epoxide monomer is represented by the following structural formula:

09/941,166

- 8 -



wherein R is represented by a structural formula selected from:



wherein:

each group  $\text{R}^1$ , each group  $\text{R}^3$  and each group  $\text{R}^4$  is independently a substituted or unsubstituted  $\text{C}_{1-12}$  alkyl,  $\text{C}_{1-12}$  cycloalkyl, aryl substituted  $\text{C}_{1-12}$  alkyl or aryl group;

each group  $\text{R}^2$  is independently a substituted or unsubstituted  $\text{C}_{1-12}$  alkylene,  $\text{C}_{1-12}$  cycloalkylene,  $\text{C}_{1-12}$  arylalkylene, or arylene group,  $-\text{Y}_1-[\text{O}-\text{Y}_1]_p-$ ,  $-\text{Y}_1-\text{Si}(\text{R}^2)_2-\text{Y}_1-$ ,  $-\text{Y}_1-\text{Si}(\text{R}^2)_2-\text{Y}_1-\text{O}-\text{Y}_1-\text{Si}(\text{R}^2)_2-\text{Y}_1-$ , or  $-\text{Y}_1-\text{Si}(\text{R}^2)_2-\text{Y}_1-\text{Si}(\text{R}^2)_2-\text{Y}_1-$ ;

each group  $\text{R}^5$  is independently, an epoxide substituted aliphatic group having 2-10 carbon atoms; and

each group  $\text{R}^6$  is independently hydrogen, an alkenyl, a substituted or unsubstituted  $\text{C}_{1-12}$  alkyl,  $\text{C}_{1-12}$  cycloalkyl, aryl substituted  $\text{C}_{1-12}$ -alkyl or aryl or  $\text{R}^2-(\text{O}-\text{Y}_1)_m-$ ,  $(\text{R}^2)_3\text{Si}-(\text{O}-\text{Si}(\text{R}^2)_2)_q-\text{Y}_1-$  or  $(\text{R}^2)_3\text{Si}-(\text{O}-\text{Si}(\text{R}^2)_2)_q-\text{O}-$ ;

each  $\text{R}^4$  is independently a substituted or unsubstituted  $\text{C}_{1-12}$  alkyl group,  $\text{C}_{1-12}$  cycloalkylalkyl group, aryl substituted  $\text{C}_{1-12}$  alkyl group or aryl group;

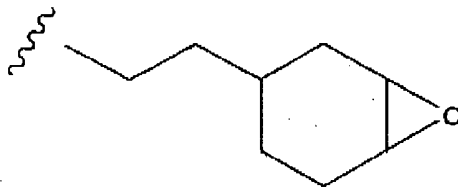
each  $\text{Y}_1$  is independently a  $\text{C}_{1-12}$  alkylene group;

09/941,166

- 9 -

p is an integer from 1 to 5; m is an integer from 1 to 10; and q is an integer from 0 to 4.

25. (Original) The holographic recording medium of Claim 24 wherein each group  $R^2$  is independently, a substituted or unsubstituted  $C_{1-12}$  alkylene,  $C_{1-12}$  cycloalkylene, aryl substituted  $C_{1-12}$  alkylene, or arylene group each  $R^6$  is independently a monovalent substituted or unsubstituted  $C_{1-12}$  alkylsilane,  $C_{1-12}$  cycloalkylsilane,  $C_{1-12}$  alkoxyasilane, aryl substituted  $C_{1-12}$  alkylsilane, a hydrogen, a vinyl, a monovalent substituted or unsubstituted  $C_{1-12}$  alkyl,  $C_{1-12}$  dialkylether,  $(C_{1-12}$  cycloalkyl) $C_{1-12}$  alkylether,  $C_{1-12}$  cycloalkyl, aryl substituted  $C_{1-12}$  alkyl or aryl group.
26. (Currently Amended) The holographic recording medium of Claim 25 wherein at least one  $R^5$  comprises the epoxide in  $R^5$  is a cycloalkene oxide.
27. (Original) The holographic recording medium of Claim 26 wherein each  $R^5$  is represented by the following structural formula:



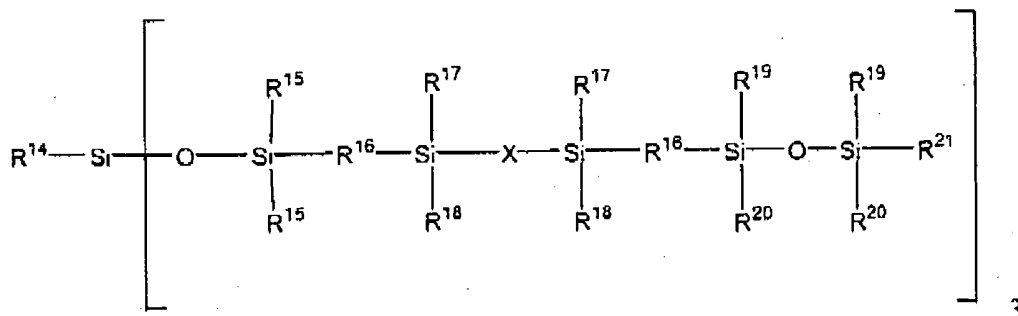
28. (Original) The holographic recording medium of Claim 27 wherein  $R^1$  is a methyl group, each group  $R^2$  is an ethylene, hexylene, or octylene group; each group  $R^3$  is a methyl group; each group  $R^4$  is a methyl group; each group  $R^5$  is a 2-(3,4-epoxycyclohexyl) ethyl grouping, and each group  $R^6$  is a hydrogen or ethenyl.
29. (Original) The holographic recording medium of Claim 23 wherein the polyfunctional



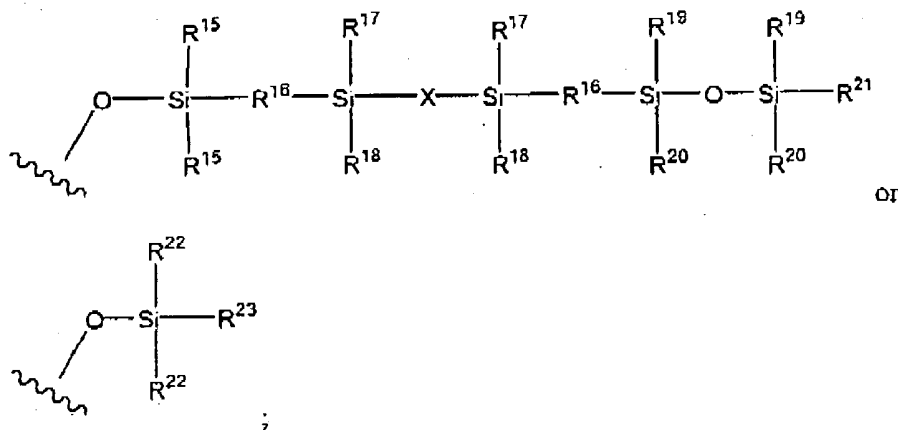
09/941,166

- 10 -

epoxide monomer is represented by the following structural formula:



wherein  $\text{R}^{14}$  is represented by a structural formula selected from:



each group  $\text{R}^{15}$ , each group  $\text{R}^{17}$ , each group  $\text{R}^{18}$ , each group  $\text{R}^{19}$ , each group  $\text{R}^{20}$  and each group  $\text{R}^{22}$  is independently a substituted or unsubstituted  $\text{C}_{1-12}$  alkyl,  $\text{C}_{1-12}$  cycloalkyl, aryl substituted  $\text{C}_{1-12}$  alkyl or aryl group;

each group  $\text{R}^{16}$  is independently a substituted or unsubstituted  $\text{C}_{1-12}$  alkylene,  $\text{C}_{1-12}$  cycloalkylene,  $\text{C}_{1-12}$  arylalkylene, or arylene group,  $-\text{Y}_1-[\text{O}-\text{Y}_1]_p-$ ,  $-\text{Y}_1-\text{Si}(\text{R}^2)_2-\text{Y}_1-$ ,  $-\text{Y}_1-\text{Si}(\text{R}^2)_2-\text{Y}_1-\text{O}-\text{Y}_1-\text{Si}(\text{R}^2)_2-\text{Y}_1-$ , or  $-\text{Y}_1-\text{Si}(\text{R}^2)_2-\text{Y}_1-\text{Si}(\text{R}^2)_2-\text{Y}_1-$ ;

each  $\text{R}^{21}$  is independently an epoxide substituted aliphatic group having 2-10 carbon atoms,

$\text{R}^{23}$  is independently hydrogen, an alkenyl, a substituted or unsubstituted  $\text{C}_{1-12}$  alkyl,  $\text{C}_{1-12}$  cycloalkyl, aryl substituted  $\text{C}_{1-12}$ -alkyl or aryl or  $\text{R}^2-(\text{O}-\text{Y}_1)_m-$ ,  $(\text{R}^2)_3\text{Si}-(\text{O}-\text{Si}(\text{R}^2)_2)_q-\text{Y}_1-$  or  $(\text{R}^2)_3\text{Si}-(\text{O}-\text{Si}(\text{R}^2)_2)_q-\text{O}-$ ;

09/941,166

- 11 -

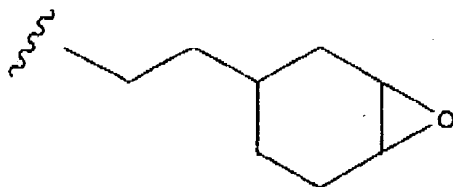
each group X is independently oxygen or R<sup>16</sup>;

each R<sup>4</sup> is independently a substituted or unsubstituted C<sub>1-12</sub> alkyl group, C<sub>1-12</sub> cycloalkylalkyl group, aryl substituted C<sub>1-12</sub> alkyl group or aryl group;

each Y<sub>1</sub> is independently a C<sub>1-12</sub> alkylene group;

p is an integer from 1 to 5; m is an integer from 1 to 10; and q is an integer from 0 to 4.

30. (Original) The holographic recording medium of Claim 29 wherein each group R<sup>16</sup> is independently a substituted or unsubstituted C<sub>1-12</sub> alkylene, C<sub>1-12</sub> cycloalkylene, C<sub>1-12</sub> arylalkylene or arylene group; R<sup>23</sup> is, independently, a hydrogen, a monovalent substituted or unsubstituted C<sub>1-12</sub> alkyl, C<sub>1-12</sub> dialkylether (alkyl-O-alkylene-), C<sub>1-12</sub> cycloalkyl C<sub>1-12</sub> alkylether, C<sub>1-12</sub> cycloalkyl, aryl substituted C<sub>1-12</sub> alkyl or aryl group; and X is oxygen.
31. (Currently Amended) The holographic recording medium of Claim 30 wherein at least one R<sup>21</sup> ~~comprises the epoxide in R<sup>21</sup>~~ is a cycloalkene oxide.
32. (Original) The holographic recording medium of Claim 31 wherein each is R<sup>21</sup> represented by the following structural formula:



33. (Original) The holographic recording medium of Claim 32 wherein each group R<sup>15</sup>, R<sup>17</sup>, R<sup>18</sup>, R<sup>19</sup>, R<sup>20</sup> and R<sup>22</sup> is a methyl group; each group R<sup>16</sup> is an ethylene, hexylene, or octylene group; and R<sup>23</sup> is a hydrogen, hexyl, or alkylether.

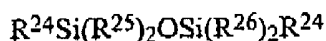
09/941,166

- 12 -

34. - 44. (Cancelled)

45. (Currently Amended) The holographic recording medium of Claim 23 additionally comprising a difunctional epoxide monomer.

46. (Previously Presented) The holographic recording media of Claim 45 wherein the difunctional epoxide monomer is represented by the following structural formula:



where each group  $R^{24}$  is a 2-(3,4-epoxycyclohexyl)ethyl grouping; each grouping  $R^{25}$  is a methyl group, and each group  $R^{26}$  is a methyl group

47. (Previously Presented) The holographic recording medium of Claim 45 wherein the holographic medium comprises between about 0.25 to about 5 parts by weight of the difunctional epoxide monomer per part by weight of the polyfunctional epoxide monomer.

48. (Previously Presented) The holographic recording medium of Claim 45 wherein the holographic medium comprises from about 90 parts binder and 10 parts monomer or oligomer (w/w) to about 10 parts binder and 90 parts monomer or oligomer (w/w).

49. (Previously Presented) The holographic recording medium of Claim 23 wherein the acid generator capable of producing an acid upon exposure to actinic radiation is a diaryliodonium salt.

50. (Previously Presented) A holographic recording medium of Claim 23 wherein the sensitizer is 5,12-bis(phenylethynyl)naphthacene.

09/941,166

- 13 -

51. (Previously Presented) The holographic recording medium of Claim 23, additionally comprising a monofunctional epoxide monomer.